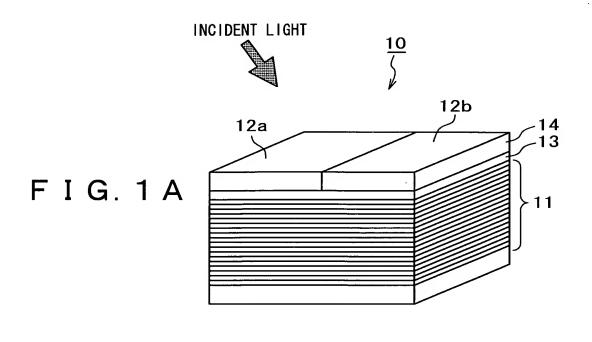
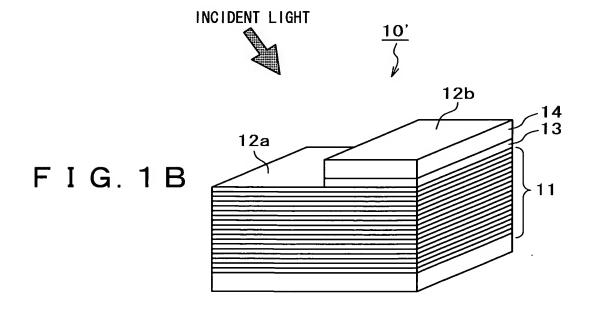
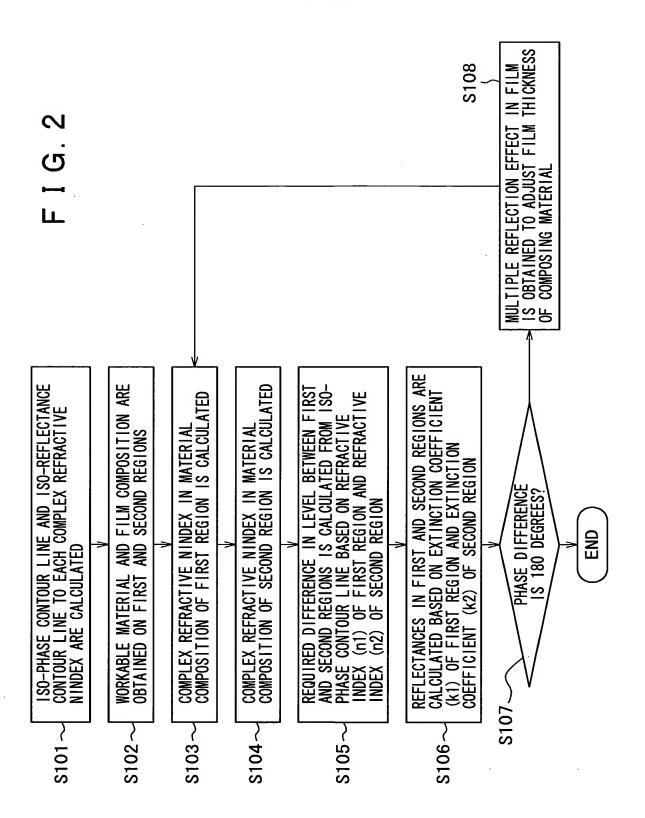
1/48

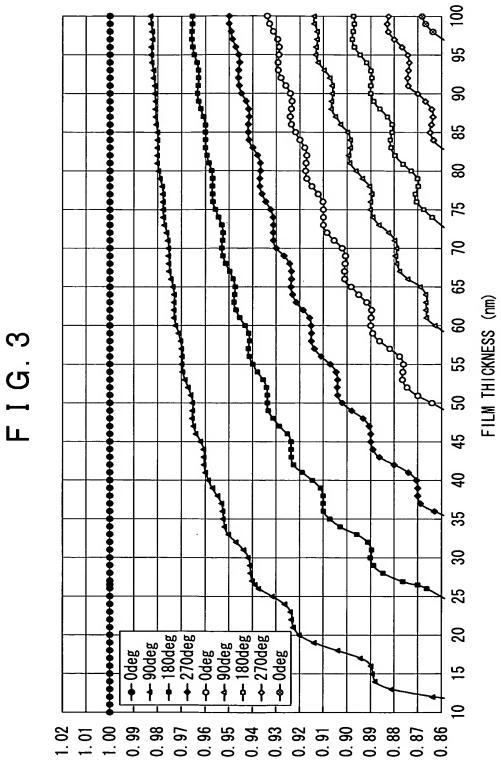


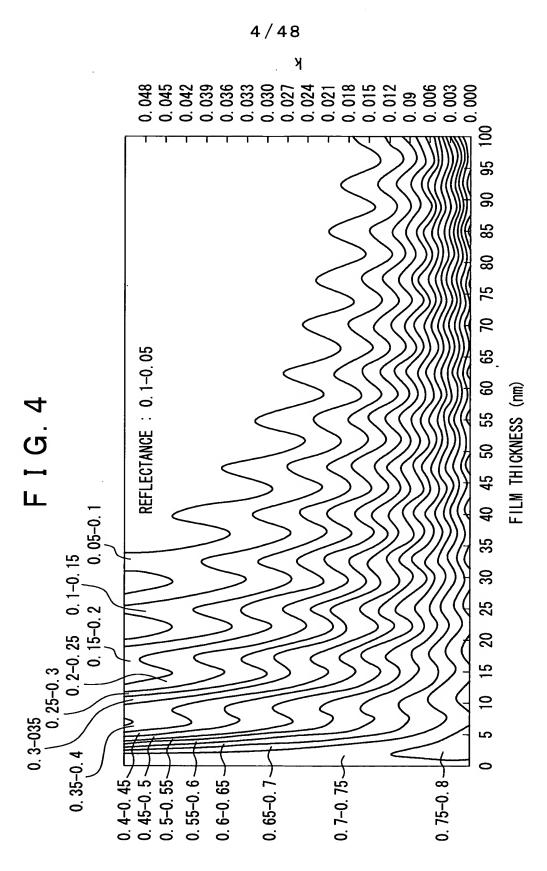


2/48

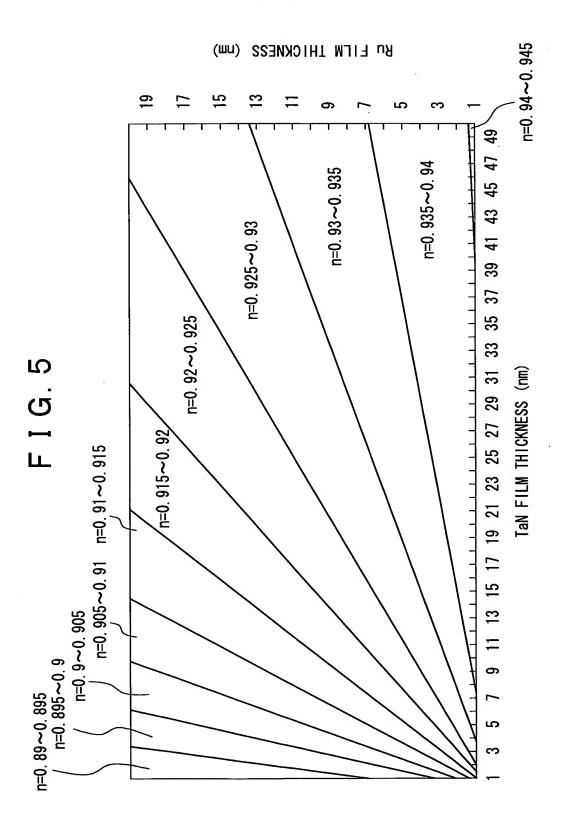


3/48

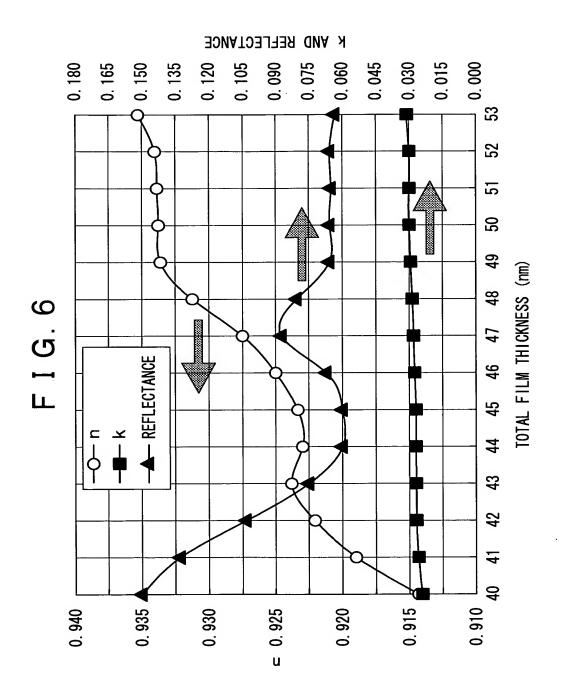




5/48



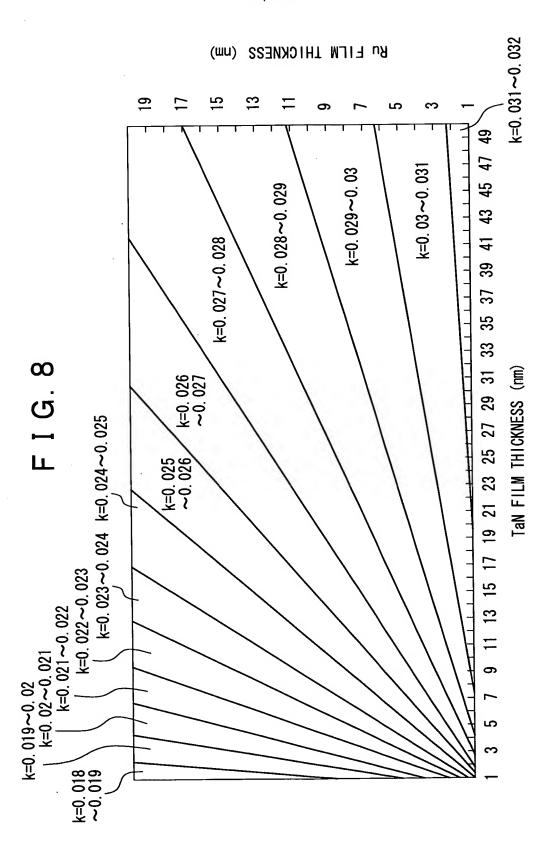
6/48



F I G. 7

		T N TILLOWESS ()
TOTAL THICKNESS (nm)	Ru THICKNESS (nm)	TaN THICKNESS (nm)
40	20	20
41	17	24
42	15	27
43	14	29
44	15	29
45	15	30
46	14	32
47	12	35
48	9	39
49	7	42
50	7	43
51	7	44
52	7	45
53	6	47

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S03P0776

166.7 161.8 7 168.2 \$\text{info.} 2 \text{info.} 7 174.5 \text{info.} 2 \text{info.} 7 174.5 \text{info.} 2 \t 9/48 5. 7 4. 6 5. 9 7. 1 44 7.8 5.9 4.6 4.7 43 43 42 41 40 40 39 39 38 10. 4 10. 5 9. 4 E 듥 9.5 10.9 8.0 36 35 ल्ल 10.3 34 34 M 2 167.6 1 170.5 1 175.58 182.93 1 32 32 169. 4 176. 0 178. 3 183. 4 191. 6 | 155.4 | 153.3 | 165.7 | 16.1 | 155.4 | 163.3 | 170.9 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 | 175.1 31 30 30 8 8-1(29 RANGE 28 REFLECTANCE 26 92 DIFFERENCE 17.5 10.9 12.1 12.1 12.1 25 ONE PHASE 2222299879222 HALF

10/48

37		79.087		54.824	68.608	177.5	177.2	170 170	. I	109. 3	~1	91. 385		219.835		\rceil		-	238.9	171.8	173 5	. I	٠I											
36	80.9	1 969	_	143.416 15	158, 579 16	172 4			.1	1/0.9	ر ا	9.92		210.516 2				46	246.7	366 1		177.3	101	2000										
35	36.8	115	26. 647 13	134. 212 14	444	╀	175 0	٠l	101.	1/8.	171.6	034	2	98. 644 21				48	240 4	٠l	188.9		100 /	.1	193. U		1						-	
34	36. 2	33, 953 12	12	13	38 817 14	6	با:		0.0/		9. 2	_	/. 51	174	202. 151			47	977 R	حا:	٠١	100 6		- 1	2/.2									
33	178.9	13				150 G	.I		165.7	176. 1	182. 1				_	215. 995		46	2111		100 5	00.0		انـ		195.5								
32	168.7			-			146.9			165.8	176. 4	184.0	86. 276	185.37	87. 361 1	204. 231 2		45	7 600	161.7	٠.		- 1	202. 4		_•1	191.8							
31	159.4						-	- 1	47.361	155.0	166.1	178.1	87.667 1	191. 711	90, 458 1	94, 351 2		44	000	200.9		102. /			. • • •	٠.	197.0							
30	106.3								_	147.4	155.5	167.9	181.35	153	196. 419	193, 435		43	2 000	7007	148.	152.0	165. /			209. 2	208.9							
79		-			-						148 0	157.5	171.2	٠	196 115	ار		67	Ľ	- 1		150.2	256. 2	169.8	185.8	200, 701	210.3	209.0						
86	2										146 5		161 2	نہ ا	.10~			11				158.0	154. 6	161.0	173.7	188.3	201.7	210.4						
76	17							-			286 A	6		165.6			[]	9	4	203. /	160.6	165.0	162. 4	160.3	165.6	176.3	189 2	7017						
띥	1											153.3	١.	٠.	١.	.10		000	7	- • •	150.8	161.9	168.5	168. 2	165.8	168 7		189 2	1, 4					
PHASE DIFFERENCE	67												157 0	ماد	.1	.10	17/1	00	38	182.0	138, 996	152.0	164.7	173.1		ľ	160.8	177.3	189 621	203	215, 695	221.		
PHASE [2/02	D	- 0	7	က	4	2	٤	7	- 0	0 0	10	2	- 6	70	2	4	4	Ru/Cr	0	_	2	C	4	- 4	9		α	0	10		12	13	14

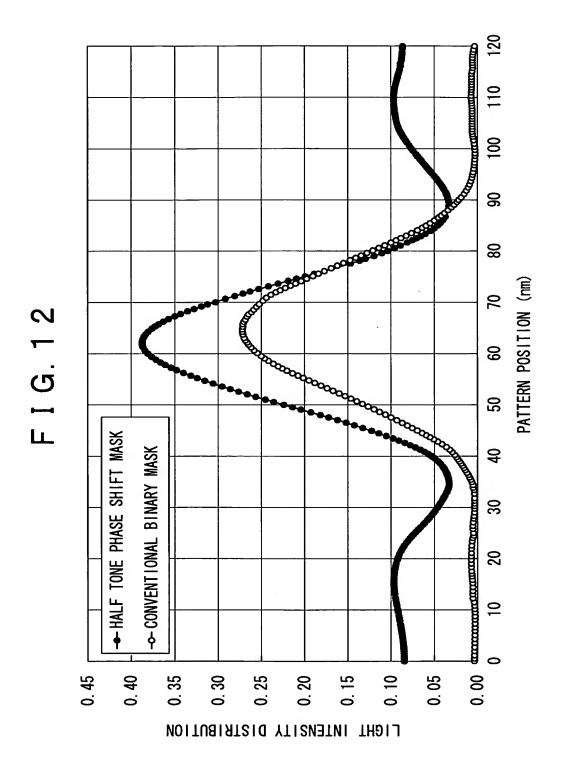
F I G. 10

11/48

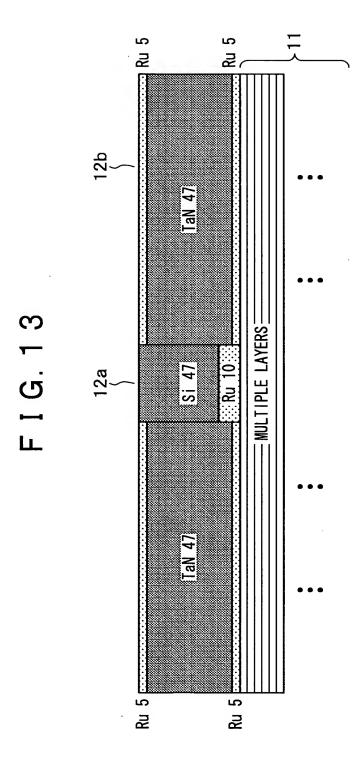
4. 0 7. 2 6. 6 6. 5 5. 3 4. 0 1. 6 2. 6 3. 7 ര് പ്ര 8. ထ 36 6.3 9.1 7.6 7.6 7.7 어(전 35 6. 0 52266 8. 5 9. 8 9. 7 4. 0 7. 4 8. 2 2.8 3.9 3.9 3.9 Ö. 8.9 7.7 8.0 7.7 8.0 7.7 8.0 8.0 5. 1 3. 9 2. 5 1. 7 1.9 2.8 8.3 6.0 47 5. 4 4. 1 2. 8 2. 0 ಜ 2.0 2.1 2.8 2.8 32 13.0 2.2 2.2 3.4 8.7 5.7 7.0 7.0 12.9 등 9. <u>ල</u> 6. 9. 3 10. 7 10. 9 9. 7 7.7 6.0 5.3 2.7 3.3 3.6 5.9 7.2 3.6 3.6 9.5 42 3.6 4.9 6.2 3.7 4.9 3.7 2.3 8.3 6.1 5 29 10. 3.5.5.0 3.5.0 3.7.5.0 3.7.5.0 3.7.5.0 3.7.5.0 3.7.5.0 3.7.5.0 3.7.5.0 3.7.5.0 3.7.5.0 28 5 0 4 12 <u>o</u> œί 6.0 7.4 7.7 11.3 40 33.29 6.52 8.66 7.66 7.66 7.66 12.7 3. TONE REFLECTANCE က ထတြ 3. <u>ದ</u> 9.0 9.7 9 3. 13 5 4 3 2 8 6 C -23 4 2 9 -3 Ru/Cr

. .

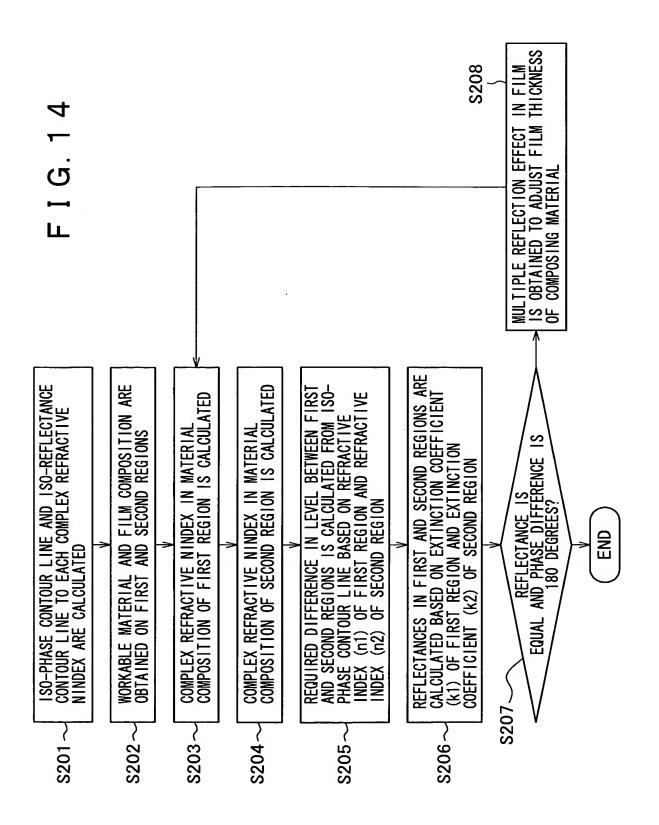
12/48



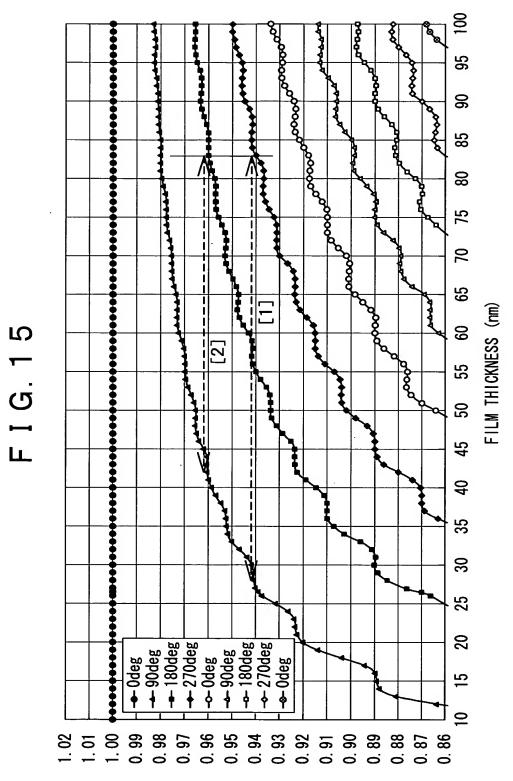
13/48



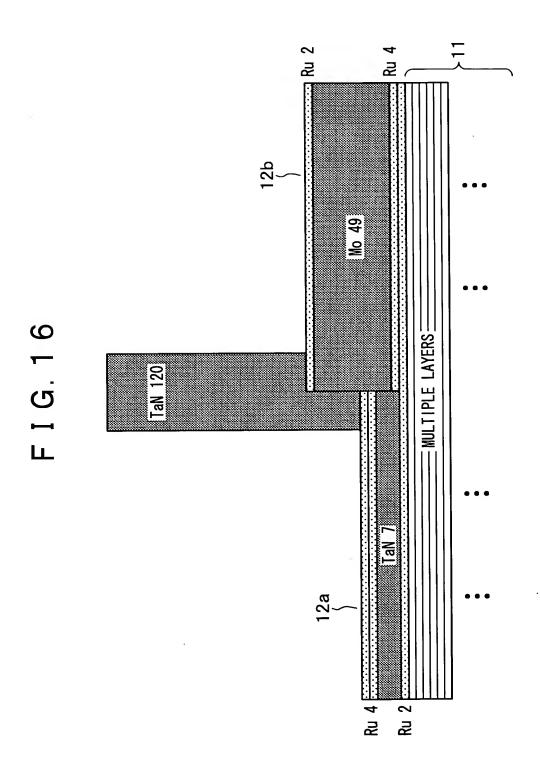
14/48



15/48

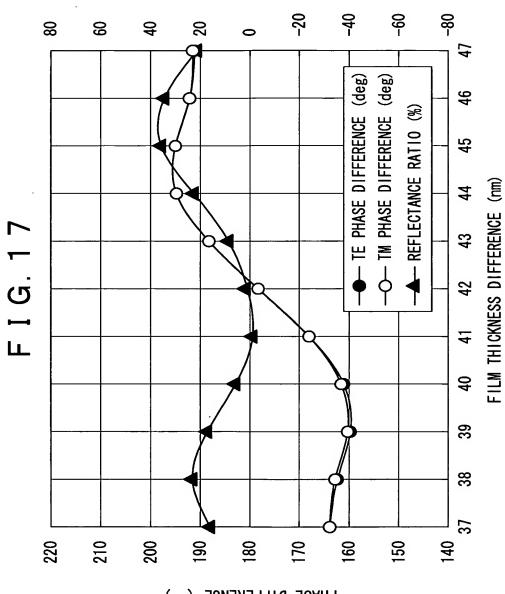


16/48.



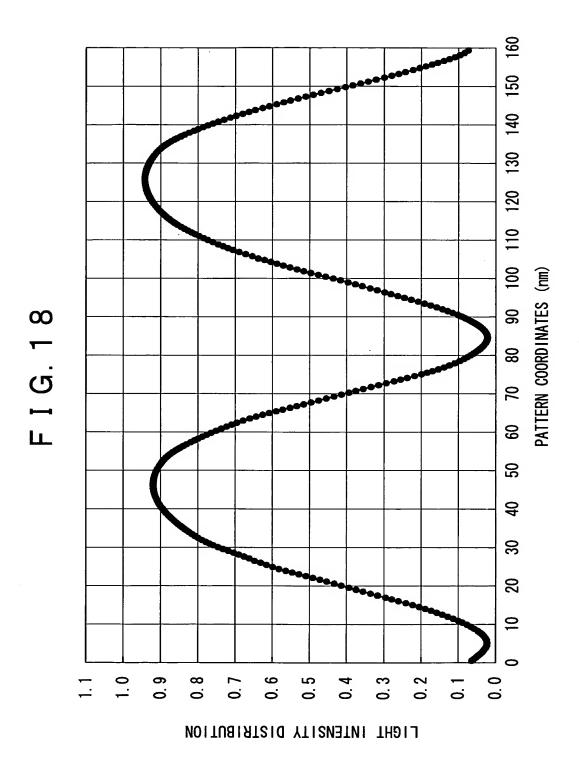
17/48

REFLECTANCE RATIO (%)

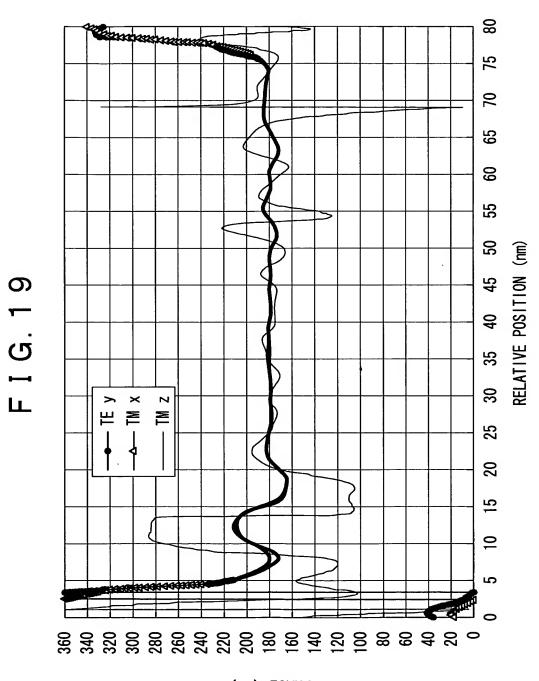


PHASE DIFFERENCE (°)

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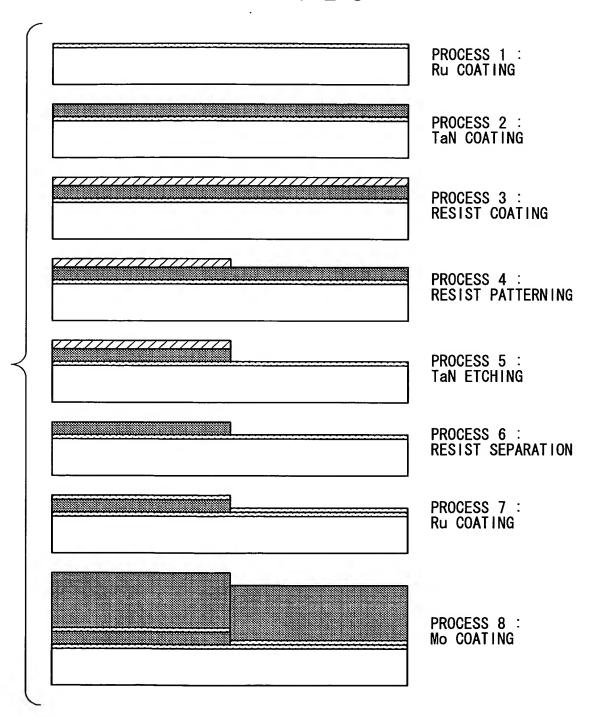


19/48

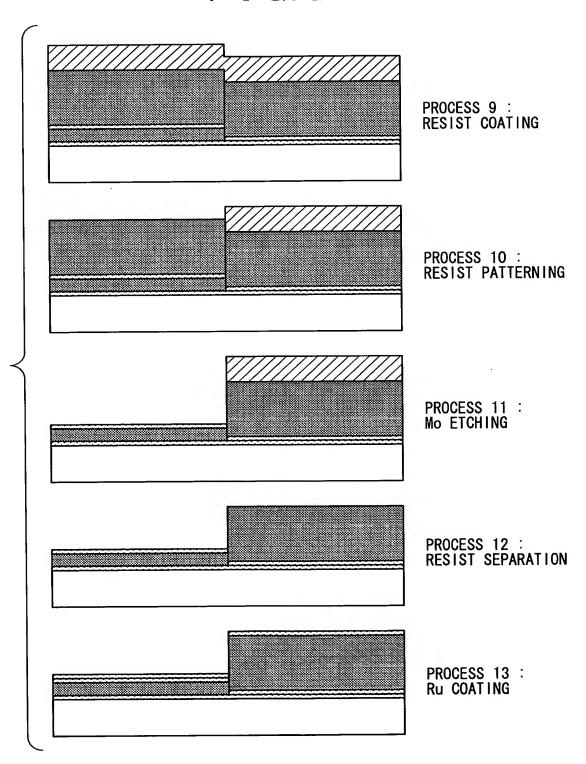


PHASE (°)

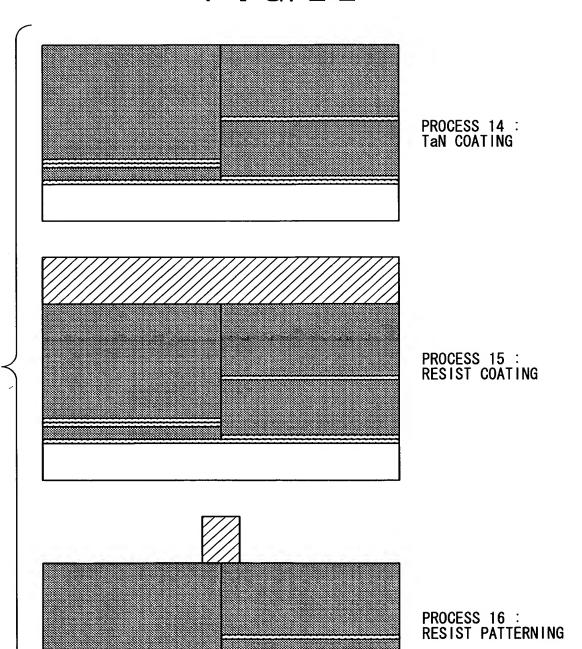
F I G. 20



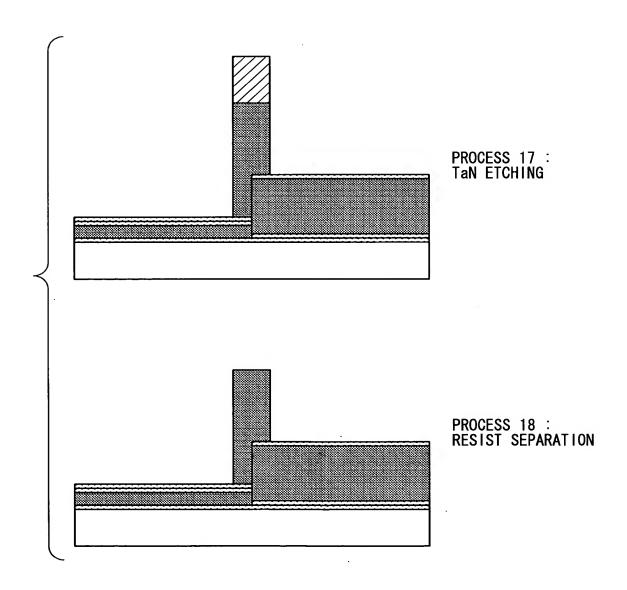
F I G. 21



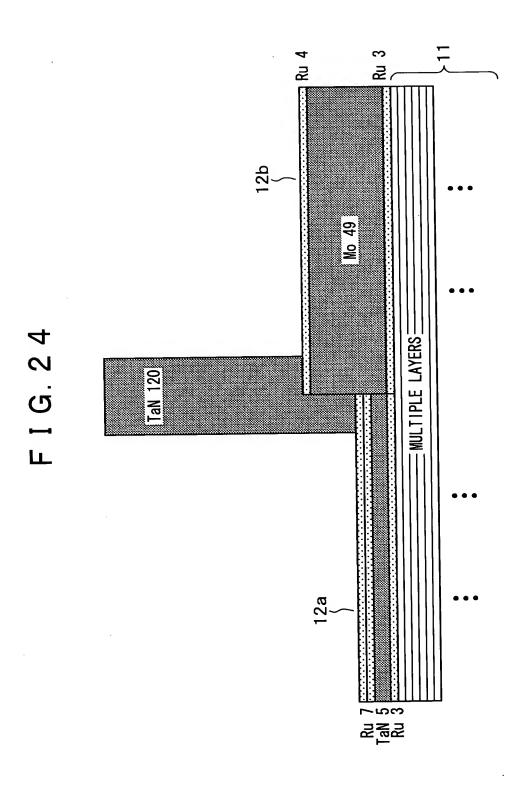
F I G. 22



F I G. 23

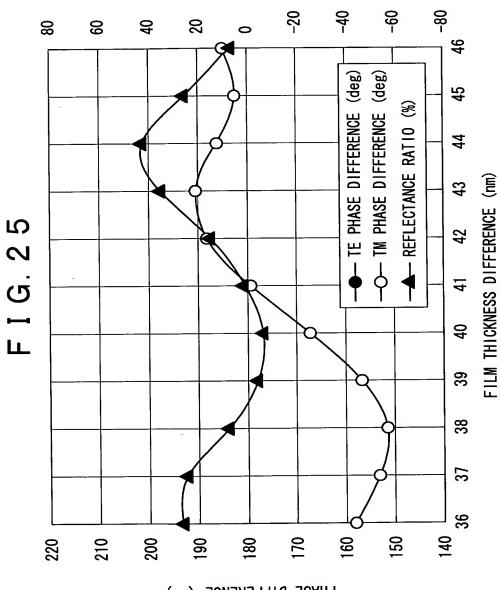


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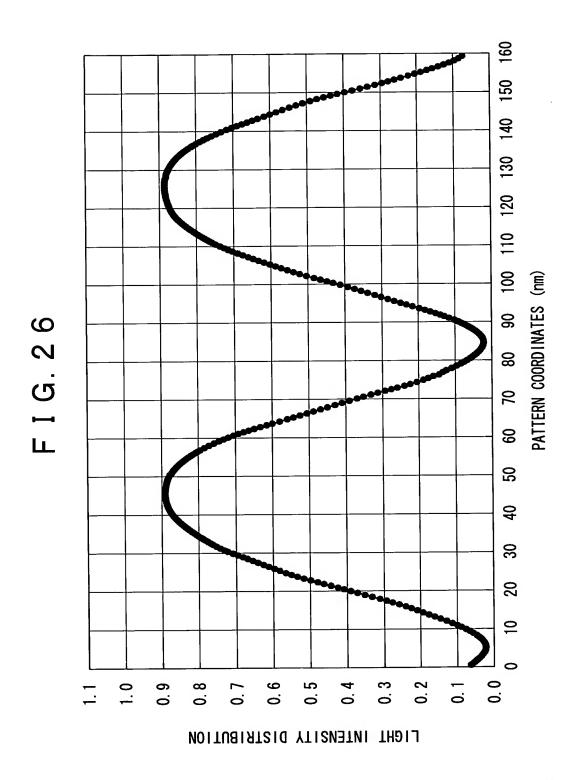
25/48

REFLECTANCE RATIO (%)

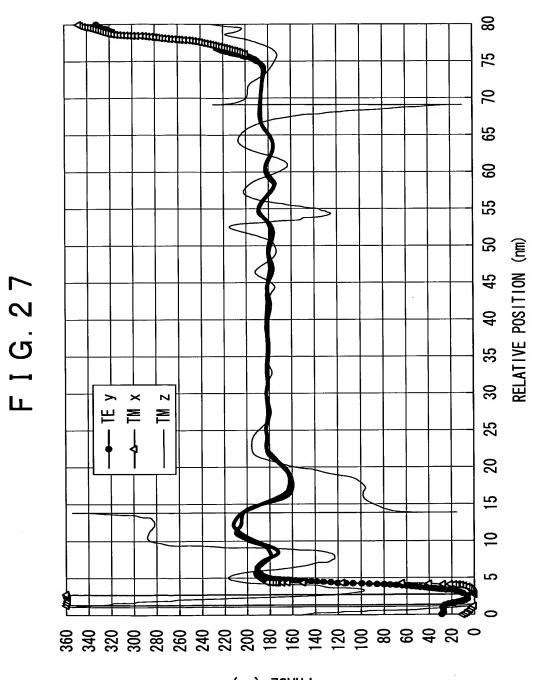


DHASE DIFFERENCE (°)

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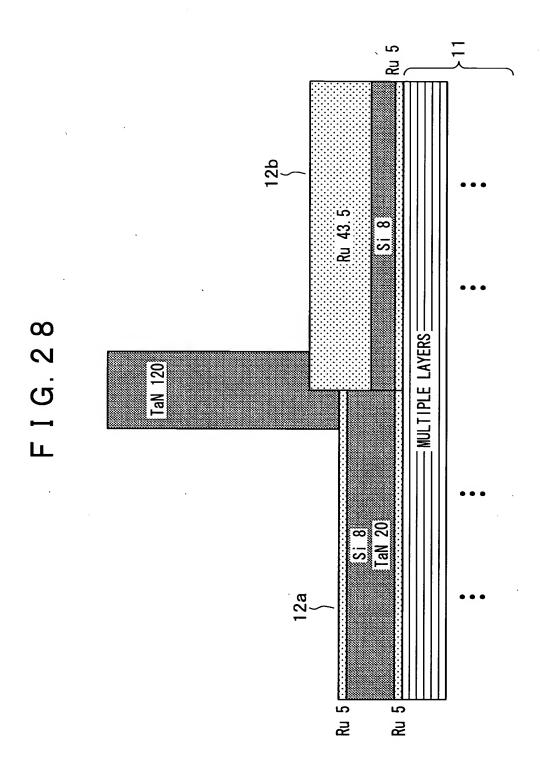


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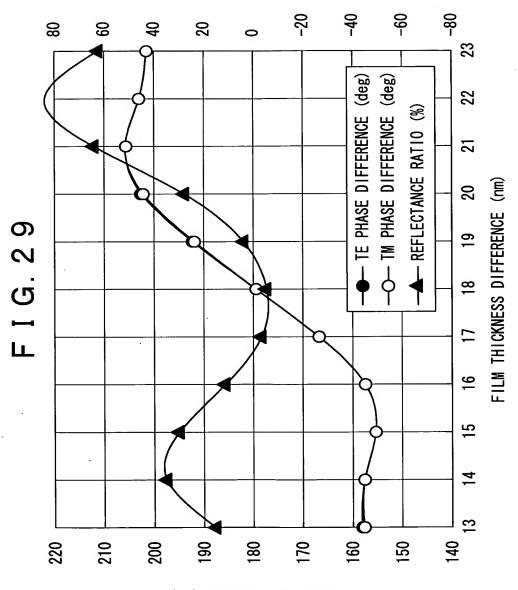
PHASE (°)

28/48



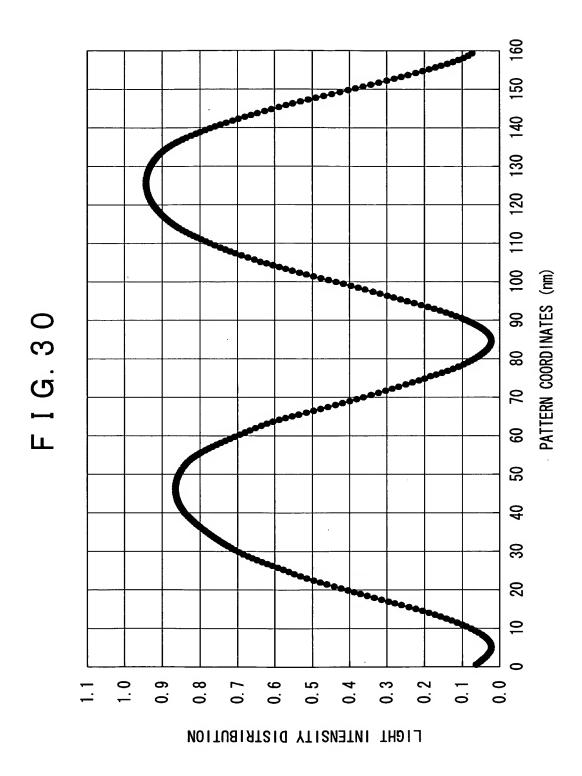
29/48

REFLECTANCE RATIO (%)

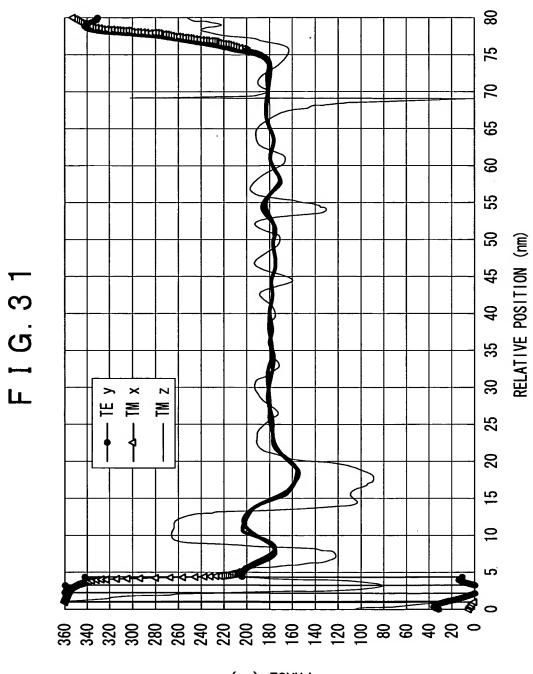


PHASE DIFFERENCE (°)

30/48

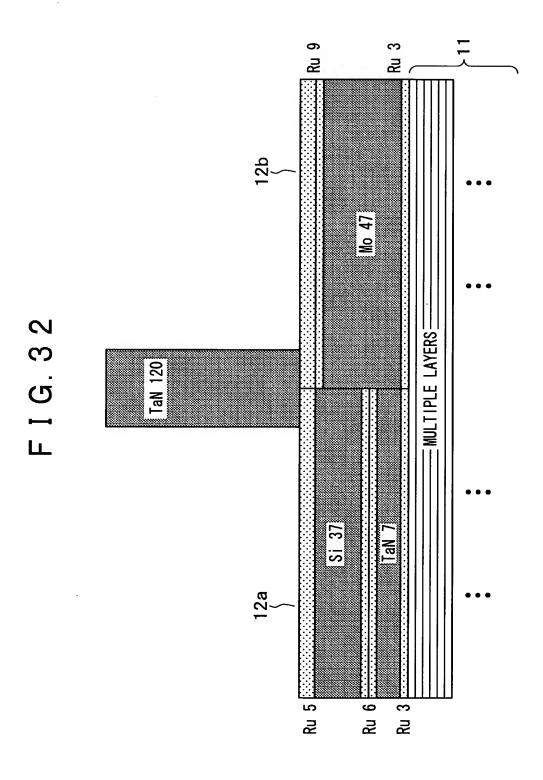


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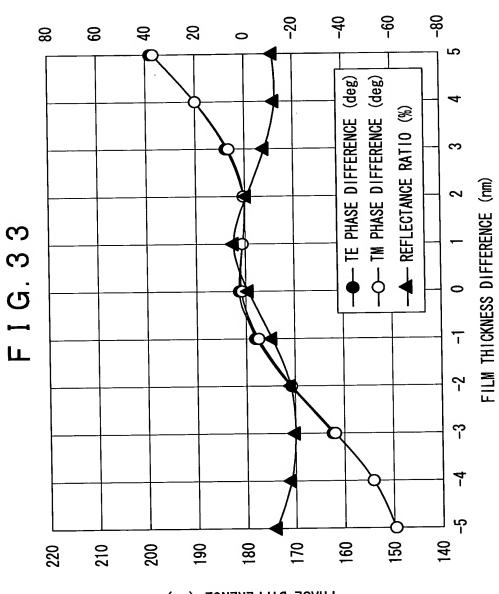
PHASE (°)

32/48



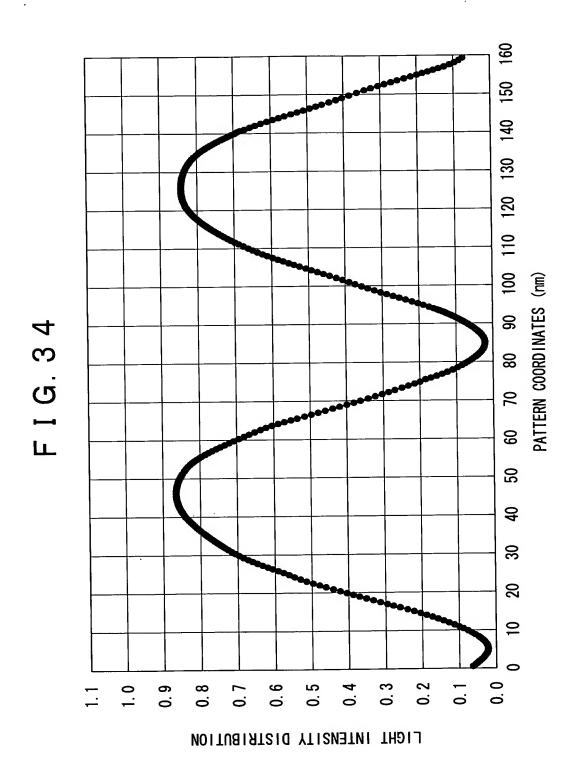
33/48

REFLECTANCE RATIO (%)

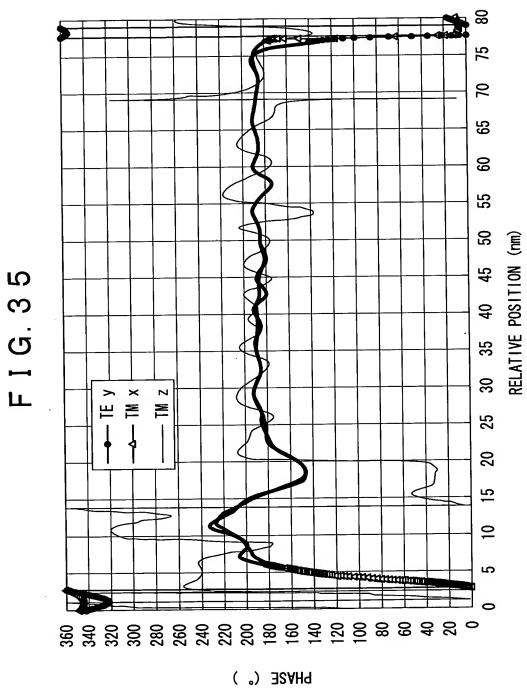


DHASE DIFFERENCE (°)

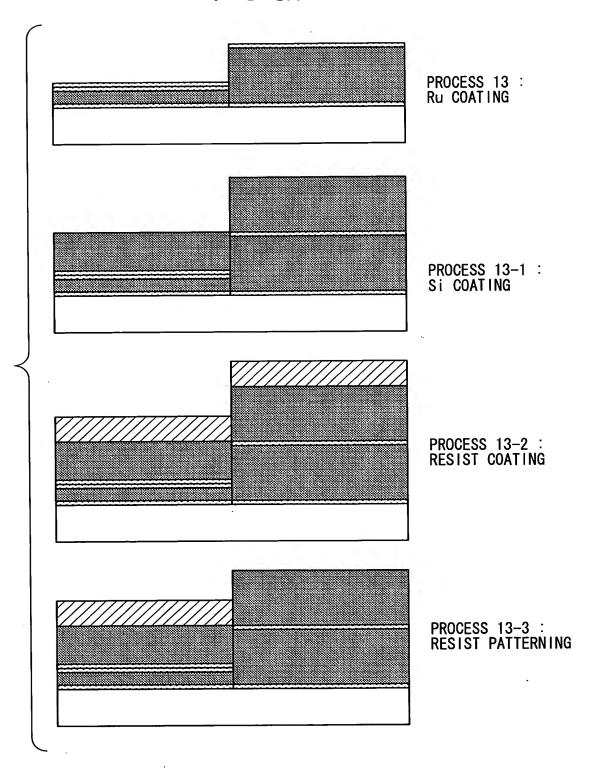
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35/48

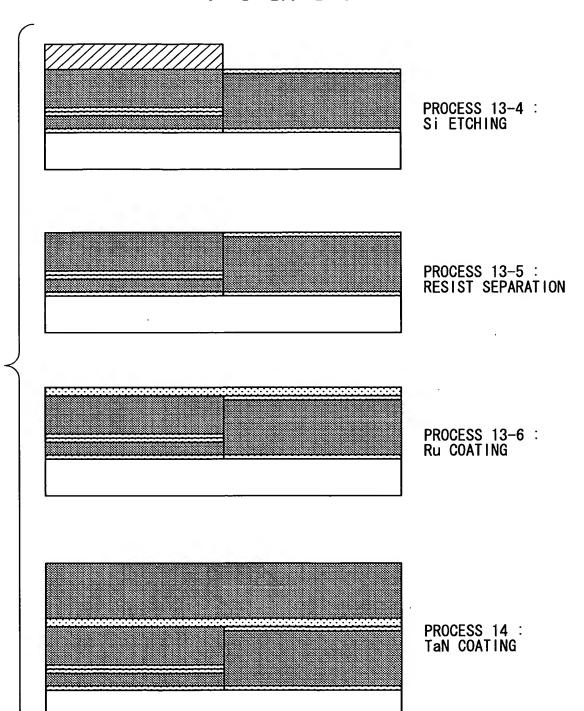


F I G. 36

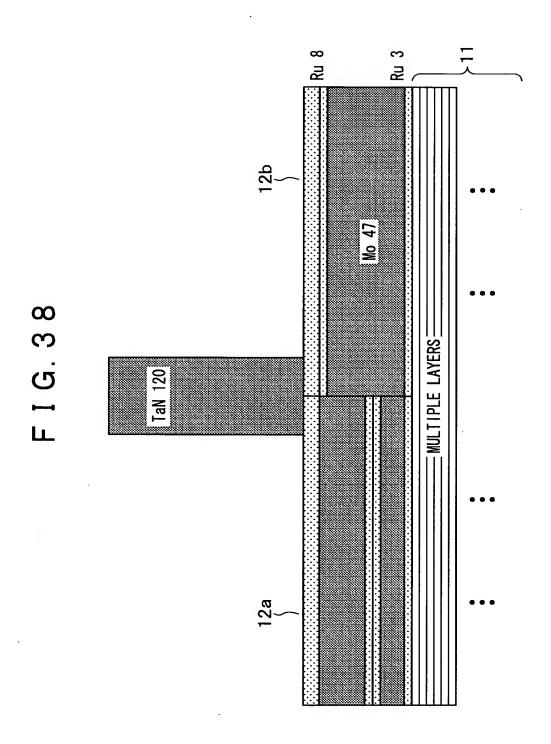


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F I G. 37

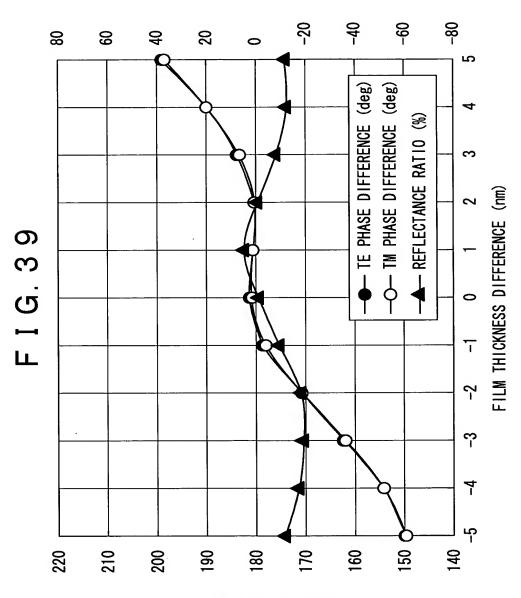


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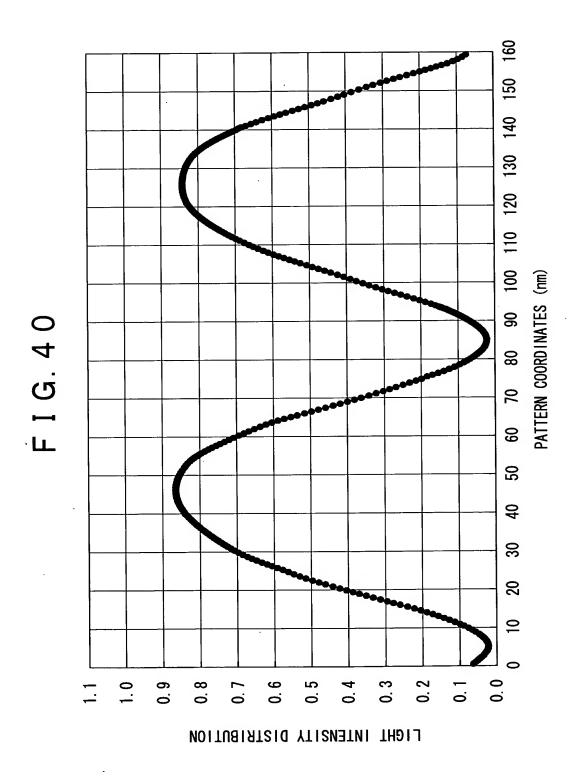
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REFLECTANCE RATIO (%)

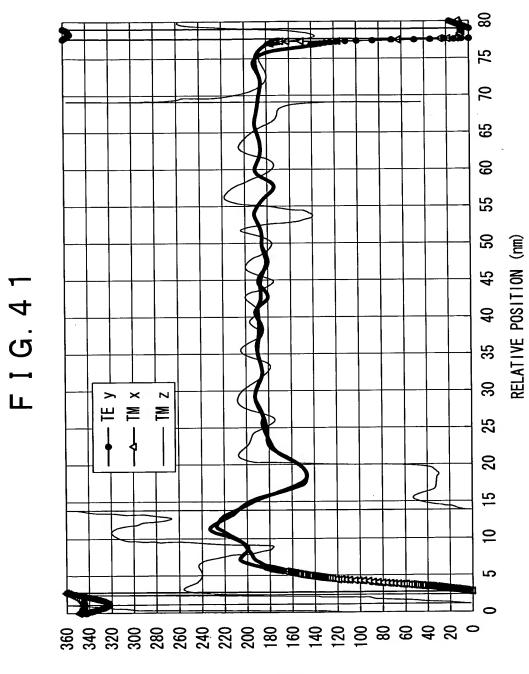


DHASE DIFFERENCE (°)

40/48

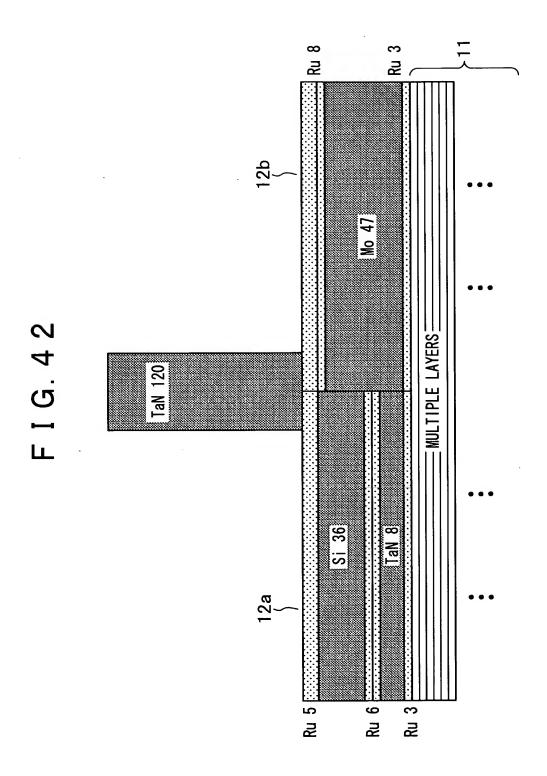


41/48



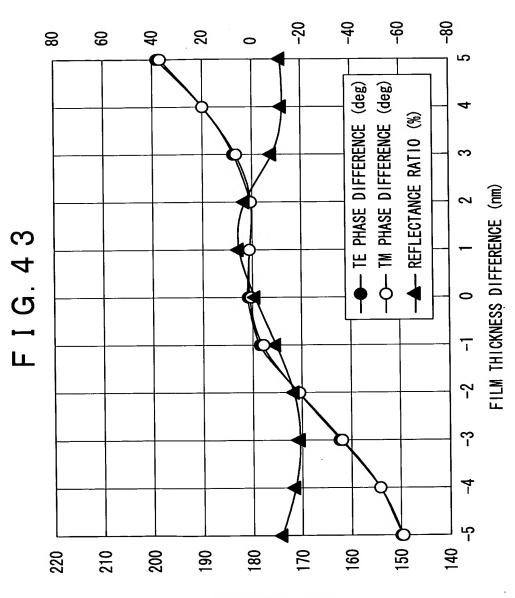
PHASE (°)

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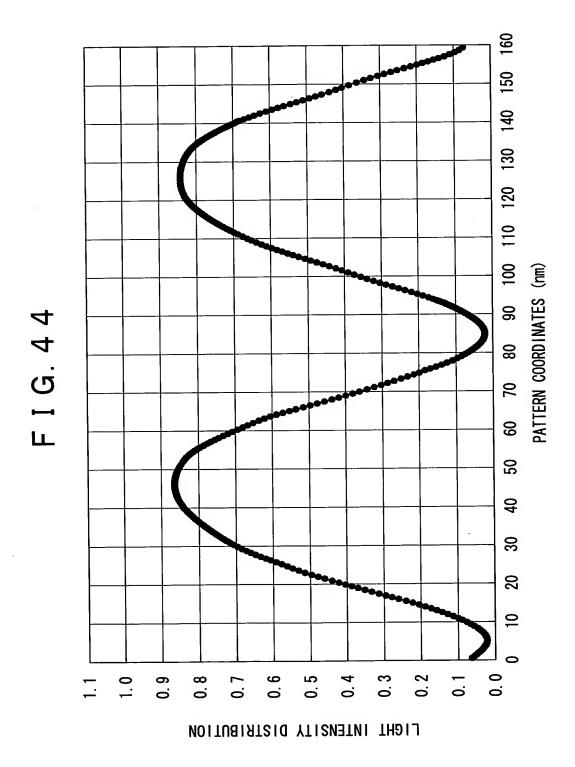
43/48

REFLECTANCE RATIO (%)

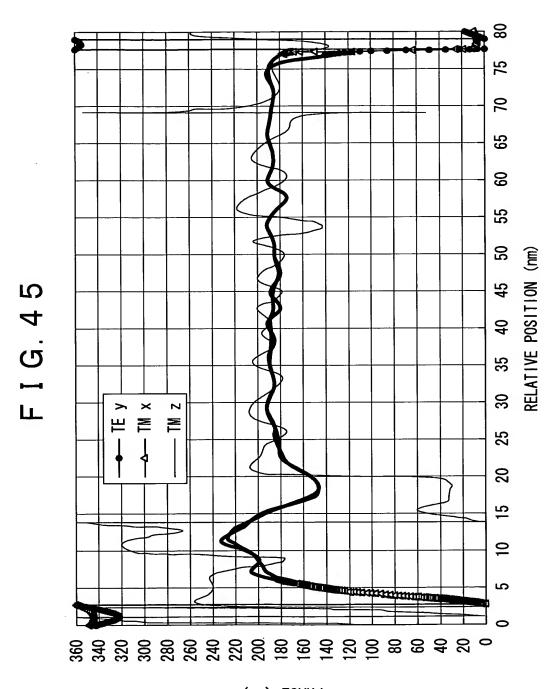


DHASE DIFFERENCE (°)

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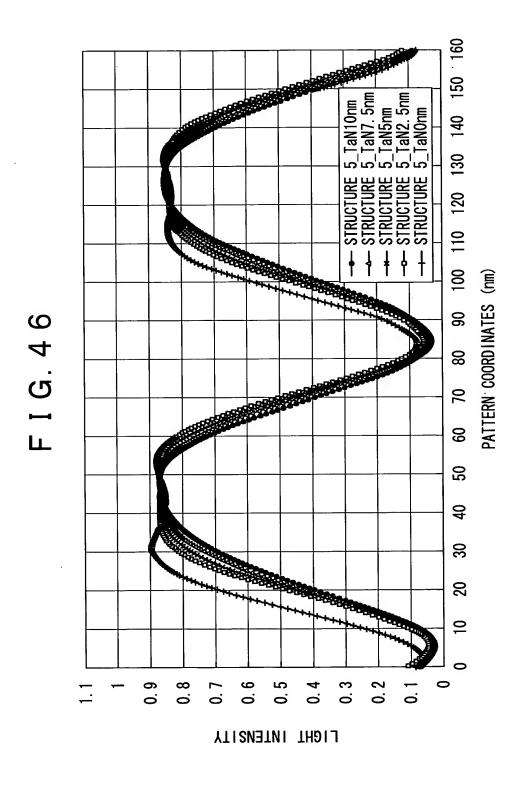


45/48

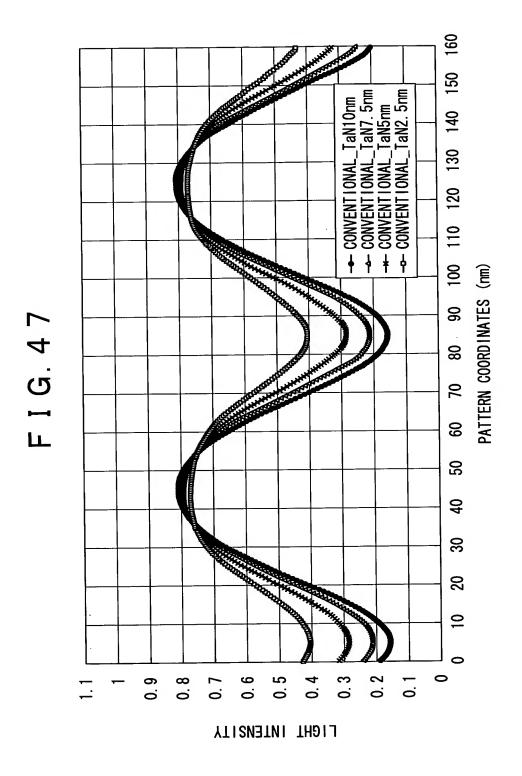


PHASE (°)

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